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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,200	12/21/2001	Michel Deeba	4007	4939

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Engelhard Corporation  
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EXAMINER

TRAN, BINH Q

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/032,200

Applicant(s)

DEEBA, MICHEL

Examiner

BINH Q. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This office action is in response to the amendment filed October 06, 2003.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

***Claims 1-2 are rejected under 35 U.S.C. 102 (e) as being anticipated by Hirota et al.***

***(Hirota'927) (Patent Number 6,233,927 B1).***

Regarding claims 1-2, Hirota'927 discloses a diesel engine exhaust system comprising: a soot filter (e.g. 7, 19); and low temperature NO<sub>2</sub> trap (11) deposited on a carrier upstream and in train with the soot filter (e.g. See Fig. 5; col. 7, lines 23-67; col. 8, lines 1-15); wherein the exhaust system further comprises a diesel oxidation catalyst (18) upstream of the carrier with the deposited NO<sub>2</sub> trap material (e.g. See Fig. 4).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 3-5, and 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota'927 in view of Hirota et al. (Hirota'246) (Patent Number 6,367,246 B1).***

Regarding claims 3, 17-18, and 21, Hirota'927 discloses a diesel engine exhaust system comprising: a soot filter (e.g. 7, 19); and low temperature NO<sub>2</sub> trap (11) deposited on a carrier upstream and in train with the soot filter (See col. 3, lines 32-67; col. 4, lines 1-14). However Hirota'927 fails to disclose that the low temperature NO<sub>2</sub> trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites.

Hirota'246 teaches that it is conventional in the art, to use a low temperature NO<sub>2</sub> trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites (e.g. See col. 3, lines 32-67; col. 4, lines 1-14), which are carried on a carrier for absorbing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing into the absorbent is lean, and releasing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a low temperature NO<sub>2</sub> trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites of Hirota'927, as taught by Hirota'246 for the purpose of absorbing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing

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into the absorbent is lean, and releasing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 4, Hirota'246 further discloses that the zeolites are selected from the group consisting of ZSM-5, ETS-10,  $\gamma$  zeolite, Beta zeolite, ferrierite, mordenite, titanium silicates, and aluminum phosphates (See col. 11, lines 5-47).

Regarding claim 5, Hirota'246 further discloses that the base metals are selected from the group consisting of Mn, Cu, Fe, Co, W, Re, Sn, Ag, Zn, Mg, Li, Na, K, Cs, Nd, Pr and combinations thereof (See col. 11, lines 5-47).

Regarding claim 10, Hirota'927 further discloses that the a diesel oxidation catalyst (18) upstream of the soot filter (7) (See Fig. 4).

Regarding claim 11, Hirota'927 further discloses that the NO<sub>2</sub> trap material (11) is deposited on a carrier that is interposed and in train with the diesel oxidation catalyst (18) and the soot filter (7) (See Fig. 4).

Regarding claim 12, Hirota'246 further discloses that the system comprising a canister, wherein the canister houses both the low temperature NO<sub>2</sub> trap material and the soot filter (See Fig. 4; col. 6, lines 10-56).

Regarding claim 13, Hirota'246 further discloses that the soot filter comprises a ceramic monolithic structure having an upstream axial end and a downstream axial end, the structure having parallel flow channels with macroporous walls, wherein the channels having an opening at the upstream axial end are closed at the downstream axial end, and the channels having an

opening at the downstream axial end are closed at the upstream axial end, thereby defining upstream and downstream sides of the channel walls (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 14, Hirota'246 further discloses a catalyst composition is deposited on the downstream side of the channel walls of the soot filter (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 15, Hirota'246 further discloses that the catalyst composition, deposited on the downstream side of the channel walls of the soot filter, comprises a lean NO<sub>x</sub> catalyst composition (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 16, Hirota'246 further discloses that the catalyst composition, deposited on the downstream side of the channel walls of the soot filter, comprises a catalyst composition effective for the combustion of unburned hydrocarbons and carbon monoxide (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 19, Hirota'246 further discloses that the low temperature NO<sub>2</sub> trap material comprises zeolites selected from the group consisting of acidic zeolites and base-metal exchanged zeolites (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 20, Hirota'246 further discloses that the exhaust system further comprises a lean NO<sub>x</sub> catalyst deposited on the soot filter (See col. 3, lines 32-67; col. 4, lines 1-14).

***Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota'927 in view of Hirota'246 as applied to claims 3, 17-18, and 21 above, and further in view of Deeba et al. (Deeba) (Patent Number 6,093,378 ).***

Regarding claim 6, Hirota'927 in view of Hirota'246 discloses all the claimed limitation as discussed above except that the zeolites comprise a trivalent metal which in combination with Si forms an oxidic skeleton

Deeba discloses a diesel engine exhaust system comprising: a low temperature NO<sub>2</sub> trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites, and wherein the low temperature NO<sub>2</sub> trap material is deposited on a carrier, wherein the zeolites comprise a trivalent metal which in combination with Si forms an oxidic skeleton (See col. 10, lines 5-67; col. 11, lines 1-45).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a low temperature NO<sub>2</sub> trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites of Hirota'927 in view of Hirota'246, as taught by Deeba for the purpose of absorbing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing into the absorbent is lean, and releasing the NO<sub>x</sub> when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 7, Deeba further discloses that the trivalent metal comprises at least one metal selected from the group consisting of Al, B, Ga, In, Fe, Cr, V, As and Sb (See col. 10, lines 5-67; col. 11, lines 1-45).

Regarding claim 8, Deeba further discloses that the zeolites comprise three-dimensional alumina-silicate zeolites characterized by pore openings whose smallest cross-section dimensions

are at least 5 Angstroms and having a silicon to alumina ratio of at least 5 (See col. 10, lines 5-67; col. 11, lines 1-45).

Regarding claim 9, Deeba further discloses that the zeolites comprise titanium silicates (See col. 12, lines 10-67; col. 13, lines 1-32).

### ***Response to Arguments***

Applicant's arguments filed May 05, 2003 have been fully considered but they are not completely persuasive. ***Claims 1-21 are pending.***

Applicants have argued that Hirota does not teach or suggest Applicant's claimed invention. More specifically, Applicant asserts that the reference to Hirota fails to disclose a **"low temperature NO2 trap material"**. The examiner respectfully disagrees, **any NO2 trap in the exhaust gas system of any internal combustion engine is a low temperature NO2 trap, since the exhaust gas temperature of an internal combustion engine is less than 1000 °C,** which is too low to compare to the exhaust gas temperature of a **jet engine (greater than thousands Celsius degree)** or the **SUN's temperature (greater than millions Celsius degree)**. In addition, Applicant has not claim what temperature range would be considered as a **low temperature range**; therefore, the use of **low temperature NO2 trap material** is so notoriously well known in the art, so as to be proper for official notice.

Moreover, Applicants have argued that Hirota'927 in combination do not teach or suggest Applicant's claimed invention. The examiner respectfully disagrees with Applicants. Both Hirota-927 and Hirota'246 are directed to substantially solving the same problem as each other that of reducing nitrogen oxide and particulates in the exhaust gas of the internal combustion



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engine by using a soot filter and NOx trap having claimed materials. It would have been obvious at the time the invention was made to a person of ordinary skill in the art, to use the NOx trap having different materials compounds and specific amounts in the Hirota'927 device as taught by Hirota'246 having both functional and structural equivalent in the art; consequently, Hirota'927 in combination with Hirota'246 clearly meets these limitations. Therefore, the examiner will not withdraw the rejection as requested by the Applicants.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (703) 305-0245. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (703) 308-2623. The fax phone number for this group is (703) 746-4561.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

A handwritten signature in black ink, appearing to read 'Binh Tran', with a long, sweeping flourish extending from the end of the signature.

BT  
December 11, 2003

Binh Tran  
Patent Examiner  
Art Unit 3748